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Respiratory Mechanism of Blocked and Normal Embryonic Cells (Orthoptera)

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EFFECTS OF ULTRACENTRIFUGING ON CERTAIN CELL STRUCTURES

R. L. KING AND H. W. BEAMS

Extremely great centrifugal forces may be obtained by the use of the air-driven ultracentrifuge developed by J. W. Beams and his associates. Such forces afford a means of testing the viscosity and relative specific gravity of many cell components. The authors have been able to establish the fact that the Nissl bodies of rat ganglion cells represent a definite material in the cell and are not the result of the action of the fixative used on homogeneous cytoplasm; likewise, for the Golgi material in the uterine gland cells of the guinea pig. In general the chromatin has been shown to be heavier than the non-chromatin materials of the nucleus of various animal and plant cells. In *Paramecium* the chromatin has been moved centrifugally and there is left in the usual position of the macronucleus an achromatic alveolar mass. In *Arcella* the chromidia are heavier than the cytoplasm and the karyosomes of the nuclei are displaced toward the centripetal pole.

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RESPIRATORY MECHANISM OF BLOCKED AND NORMAL EMBRYONIC CELLS (ORTHOPTERA)

J. H. BODINE AND E. J. BOELL

Two types of response to the action of carbon monoxide and cyanide are noted in the respiration of the embryo of the grasshopper, *Melanoplus differentialis*.

The respiratory rate of embryonic cells in a state of normally occurring physiological block or diapause is stimulated in a carbon monoxide-oxygen medium in which the oxygen tension is sufficient to sustain normal respiration. Increasing the concentration of CO and correspondingly decreasing the O₂ tension depresses the respiratory rate, but the degree of depression is, within the limits of

error, of the same magnitude as that obtained in nitrogen-oxygen mixtures of similar concentrations. Cyanide has no effect on such cells.

The oxygen consumption of physiologically active embryonic cells, on the other hand, is considerably depressed by CO/O₂ mixtures, the degree of depression depending upon the concentration of CO. At sub-minimal oxygen tensions the depression is always much greater than in nitrogen-oxygen mixtures of similar concentrations. On such cells cyanide exerts a pronounced depressing effect, but there is always a certain part of the respiratory mechanism (about 20 per cent of the total) which is unaffected by cyanide.

Thus the respiratory mechanism of the developing egg is composed of (1) a cyanide and CO insensitive fraction, and (2) a cyanide and CO sensitive fraction.

The respiration of the diapause egg, however, is completely unaffected by CO and cyanide (except for the stimulation with the former substance) and in this and in other respects it is qualitatively and quantitatively similar to the cyanide insensitive respiratory fraction of the developing egg.

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SEASONAL VARIATION IN BIRDS

EMIL WITSCHI

Wild birds show cyclical alternation between breeding seasons and seasons of sexual inactivity. During the latter the sex glands are at rest and are very small. With the approach of the breeding season they start to grow rapidly, — increasing in volume up to one thousand times. Accompanying this growth of the gonads many secondary sex characters also show a characteristic development. This is true in first respect for the sperm- and oviducts, but also external secondary sex characters often show striking changes. The bill color of the sparrow is light brown during the resting period and becomes blue black in the breeding season. In some birds, as the Rose-breasted Grosbeak, a remarkable change also takes place in the plumage. Experiments have been performed